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EXAMINER	
MENBERU, BENIYAM	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/627,972	TEREKHOV, VLADISLAV	
	Examiner	Art Unit	
	Beniyam Menberu	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 July 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/23/06,7/19/05,8/2/04,7/28/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: On page 7, paragraph 36, line 2, "operation 100" should be "operation 1000".

Appropriate correction is required.

Drawings

2. The drawings are objected to because in Figure 10B, step 1028, last line, "B" should be "A". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the

examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 5, 6, and 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5704026 to Wan.

Regarding claim 5, Wan discloses a method of color correction after gamut mapping, comprising:

regenerating a gamut shape in a device independent color space (DICS) into a predetermined structure represented in a three-dimensional space (column 6, lines 23-67);

dividing the structure of the gamut shape represented in the three-dimensional space into planes (column 6, lines 50-67);

connecting respective points in a set of points created by intersection of the gamut shape with the planes (Figure 10, 11; planes formed by L=L1, Li ..; The reference 50 connects the points of intersection of vectors u_i with gamut 12 in Figure 11. (column 7, lines 65-67; column 8, lines 1-10))

calculating a color value of each point (column 8, lines 10-15);

determining whether a structure formed of points to be color-inverse-transformed includes points generated by the gamut-plane intersection (Figure 3, reference ILUT 2; column 4, lines 1-30; column 8, lines 10-45; column 2, lines 54-67; column 3, lines 1-2;); and

performing a color inverse transformation process by linear interpolation in the structure(column 8, lines 10-15).

Regarding claim 6, Wan teaches all the limitations of claim 5. Further Wan discloses the method of claim 5, wherein:

the regenerated gamut shape is represented in the three-dimensional space by a set of tetrahedrons, cubes, pyramids, prisms, or lines (Figure 11, the lines formed by 50 ; column 8, lines 1-14).

Regarding claim 8, Wan teaches all the limitations of claim 5. Further Wan discloses the method of claim 5, wherein the calculating of the color value comprises:

performing a linear interpolation between vertexes of the structure of the gamut shape represented in the three-dimensional space (column 5, lines 45-67; column 6, lines 1-22).

Regarding claim 9, Wan teaches all the limitations of claim 5. Further Wan discloses the color correction method of claim 5, wherein the determining of whether a structure includes points generated by the gamut-plane intersection comprises:

performing a point-triangle-inclusion test for determining whether a triangle including points to be color-inverse-transformed includes points generated by the gamut-plane intersection (column 4, lines 35-67; column 5, lines 1-40; Figure 4, 5, point y, triangle y1, y2, y3).

Regarding claim 10, Wan teaches all the limitations of claim 9. Further Wan discloses the color correction method of claim 9, wherein the performing of the color inverse transformation, comprises

performing a linear interpolation in the triangle (Figure 3, reference ILUT 2; column 4, lines 1-30; column 8, lines 10-45; column 2, lines 54-67; column 3, lines 1-2).

).

Regarding claim 11, Wan teaches all the limitations of claim 10. Further Wan discloses the color correction method of claim 10, wherein the performing of the linear interpolation comprises:

providing coordinate values of the points to be color-inverse-transformed and color values of the respective vertexes of the triangle (column 7, lines 1-35; column 8, lines 1-50)

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6075885 to Taniguchi et al in view of U.S. Patent No. 5704026 to Wan.

Regarding claim 1, Taniguchi et al discloses a method of color correction, comprising:

selecting gamut boundary signals from a gamut in a device independent color space (column 8, lines 24-49);

dividing the gamut into a set of triangles representing a gamut shape in the device independent color space (DICS) (column 7, lines 12-30);

intersecting the gamut with a first predetermined number of planes which are perpendicular to an a*b* two-dimensional space and intersect each other on an L* axis

(column 12, lines 1-10; column 13, lines 8-24; column 13, lines 45-50; Figure 15; Figure 21; Since the plane includes the L axis it must be perpendicular to a*b* plane and the planes intersect at the point of axis AX in Figure 15). However Taniguchi et al does not disclose

a) dividing each plane into a second predetermined number of radial unit vectors;

b) selecting each plane and each unit vector that are separated at a predetermined angle; and

c) determining an intersection point between a gamut boundary and each selected unit vector, by using a ray-triangle-inclusion test.

Wan discloses

a) dividing each plane into a second predetermined number of radial unit vectors (column 3, lines 30-32; column 8, lines 1-10);

b) selecting each plane and each unit vector that are separated at a predetermined angle (column 8, lines 30-50; The plane is perpendicular and each vector u is at specific angle; and

c) determining an intersection point between a gamut boundary and each selected unit vector, by using a ray-triangle-inclusion test (column 7, lines30-65; Figure 9).

Taniguchi et al and Wan are combinable because they are in the similar problem area of gamut processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the gamut calculation of Wan with the system of Taniguchi et al to implement gamut boundary calculation using radial vectors.

The motivation to combine the reference is clear because Wan provides efficient system for gamut description (column 3, lines 35-54).

Regarding claim 4, Wan teaches all the limitations of claim 1. Further Wan discloses the method of claim 1, wherein said second predetermined number is 180 (column 8, lines 6-8, 25-29; parameter "s").

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6075885 to Taniguchi et al in view of U.S. Patent No. 5704026 to Wan further in view of U.S. Patent No. 7158670 to Fushiki et al.

Regarding claim 2, Taniguchi et al in view of Wan teach all the limitations of claim 1. However Taniguchi et al in view of Wan does not disclose the method of claim 1, further comprising:

defining a gamut mapping direction according to sizes of a source gamut and a reproduction gamut, in which the gamut mapping direction proceeds from a gamut having a smaller size to a gamut having a larger size.

Fushiki et al disclose defining a gamut mapping direction according to sizes of a source gamut and a reproduction gamut, in which the gamut mapping direction proceeds from a gamut having a smaller size to a gamut having a larger size (column 2, lines 4-67; column 4, lines 35-42).

Taniguchi et al, Wan, and Fushiki et al are combinable because they are in the similar problem area of gamut processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the gamut expansion of Fushiki et al with the system of Taniguchi et al in view of Wan to implement gamut expansion for imaging system.

The motivation to combine the reference is clear because the system of Fushiki et al provides an accurate system for color images (column 2, lines 27-40).

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6075885 to Taniguchi et al in view of U.S. Patent No. 5704026 to Wan further in view of U.S. Patent No. 5883632 to Dillinger.

Regarding claim 3, Taniguchi in view of Wan teaches all the limitations of claim 1. However Taniguchi in view of Wan does not disclose wherein the first predetermined number is 360.

Dillinger discloses the method of claim 1, wherein the first predetermined number is 360 (column 5, lines 23-30; Figure 8;column 31, lines 26-46).

Taniguchi et al, Wan, and Dillinger are combinable because they are in the similar problem area of gamut processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the gamut processing of Dillinger with the system of Taniguchi et al in view of Wan to implement 360 gamut division for gamut processing.

The motivation to combine the reference is clear because Dillinger teaches that 360 division provides less error than using less division in the gamut (column 31, lines 39-45).

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5704026 to Wan in view of U.S. Patent No. 6483518 to Perry et al.

Regarding claim 7, Wan teaches all the limitations of claim 5. However Wan does not disclose wherein the connecting of the respective points comprises: performing a Delaunay triangulation algorithm.

Perry et al disclose wherein the connecting of the respective points comprises: performing a Delaunay triangulation algorithm (column 6, lines 40-45; column 18, lines 1-10).

Wan and Perry et al are combinable because they are in the similar problem area of gamut processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the Delaunay algorithm of Perry et al with the system of Wan to implement Delaunay method for gamut processing.

The motivation to combine the reference is clear because for triangle based gamut processing Perry et al teaches that Delaunay method is appropriate (column 18, lines 6-10).

10. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5704026 to Wan in view of U.S. Patent No. 6819458 to Tanaka et al.

Regarding claim 12, Wan discloses a method of correcting a source device color into a target device color, the method comprising:

obtaining an array of color points of a source device represented in a predetermined color space (Figure 3, reference 22, 28; column 3, lines 60-67; column 4, line 1);

obtaining an array of color points of a target device represented in the same color space (Figure 3, reference 24, 34; column 4, lines 9-30; Figure 3, reference 30 ; Both the device 1 and device 2 data are transformed to the common color 30.);

producing gamut descriptors of the source device and the target device (Figure 3, reference 38, 42; column 4, lines 15-30);

gamut-mapping the color point array of the source device into that of the target device (column 4, lines 1-30). However Wan does not disclose performing a color inverse transformation process to thereby calculate an RGB value for the gamut-mapped point arrays.

Tanaka et al disclose performing a color inverse transformation process to thereby calculate an RGB value for the gamut-mapped point arrays (column 28, lines 25-31; column 6, lines 9-15).

Wan and Tanaka et al are combinable because they are in the similar problem area of gamut processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the color inversion of Tanaka et al with the system of Wan to implement color inversion to generate RGB values.

The motivation to combine the reference is clear because the system of Tanaka provides color transformation accurately (column 3, lines 3-24).

Regarding claim 13, Wan in view Tanaka et al teach all the limitations of claim 12. Further Wan discloses the method of claim 12, wherein the predetermined color space is an L*a*b* coordinate system (column 3, lines 3-51).

11. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5704026 to Wan in view of U.S. Patent No. 6819458 to Tanaka et al further in view of U.S. Patent No. 5883632 to Dillinger.

Regarding claim 14, Wan in view Tanaka et al teach all the limitations of claim 12. Further Wan discloses wherein the producing of the gamut descriptors comprises:
reading an array of the points represented in the color space (column 3, lines 64-67; column 4, lines 1-10);
reading a grid parameter in the color space (column 3, lines 55-60; column 8, lines 57-60);
selecting a square forming the grid (column 9, lines 5-7);
dividing the square into two triangles (column 9, lines 7-9);
storing coordinates of the vertexes of each triangle (column 9, lines 9-40);

producing a unit vector (line) having a start point and a predetermined rotational angle (column 9, lines 40-57);

detecting intersection points between the two triangles and the unit vector (column 9, lines 11-18). However Wan in view of Tanaka et al does not disclose

a) detecting points having the maximal chromaticity among the intersection points within a current gamut boundary

b) and in which the gamut is divided into planes arranged at predetermined angles.

Dillinger discloses

a) detecting points having the maximal chromaticity among the intersection points within a current gamut boundary (column 5, lines 23-30; Figure 8;column 31, lines 26-39; column 23, lines 55-64)

b) and in which the gamut is divided into planes arranged at predetermined angles (column 5, lines 23-30; Figure 8;column 31, lines 26-46).

Wan, Tanaka et al, and Dillinger are combinable because they are in the similar problem area of gamut processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the gamut processing of Dillinger with the system of Wan in view of Tanaka et al to implement maximum chroma detection and gamut plane division.

The motivation to combine the reference is clear because the system of Dillinger can be used to generate an estimate of a gamut (column 31, lines 30-38).

Other Prior Art Cited

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 7177465 to Takahira discloses color space processing.

U.S. Patent No. 5398120 to Friedman et al disclose color mapping.

U.S. Patent No. 6633668 to Newman disclose color processing.

U.S. Patent No. 7106474 to Haikin et al disclose color conversion.

U.S. Patent Application Publication US 2005/0276473 A1 to Um et al disclose color conversion.

U.S. Patent No. 4169285 to Walker disclose color displaying system.

U.S. Patent Application Publication US 2004/0100643 A1 to Jones et al disclose gamut processing.

U.S. Patent No. 6373595 to Semba et al disclose increasing of output gamut.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Beniyam Menberu whose telephone number is (571) 272-7465. The examiner can normally be reached on 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Aung Moe can be reached on (571) 272-7314. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is (571) 272-2600. The group receptionist number for TC 2600 is (571) 272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov/>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patent Examiner

Beniyam Menberu

BM

06/10/2007

KA Williams
Primary Examiner